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SAPC 25925
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25 March 1958

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Dear Dick:

We are forwarding herewith Progress Letter No. 17 covering work performed in connection with System No. 4 during the period extending from 1 February 1958 to 1 March 1958.

Sincerely,

Burt

Burt

BFM
bqm

Enclosures:
CMCC Doc. 163X5.69
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Progress Letter No. 17

Contract No. A-101

System 4

1 February 1958 to 1 March 1958

CMCC Document No. 163X5.69

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including this title sheet.)

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1. General

During the period covering by this progress letter, the following work was performed:

- (1) System environmental tests on Model 103 were concluded.
- (2) Model 103 was released to the field and underwent several flight tests.
- (3) Construction of Model 104 was completed and laboratory testing of subassemblies and major units was started.

2. Environmental Testing

a. The formal system environmental tests on Model 103 were concluded on 7 February 1958. Testing was terminated on this date because it was necessary to surrender the tank-in-use to the loaning facility, and because final checkout and packing were necessary to ready the equipment for shipment to the field. With the exception of the Band 1 receiving equipment, Model 103 performed satisfactorily under the altitude conditions simulated by the environmental test procedure.

b. By 13 February 1958, Model 103, less the Band 1 receiving equipment, was delivered to the field. The Band 1 receiver was retained at the contractor's plant over the following weekend. After the application of expedient cooling methods, the Band 1 receiver performed satisfactorily for eight hours of sustained operation at a simulated altitude of 40,000 feet. As indicated in Progress Letter No. 16, most of the difficulties with Band 1 receivers are due to temperature sensitivity of the local oscillators used in the second frequency conversion process. The additional cooling was applied to these subassemblies. No further electrical changes were made.

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3. Flight Tests

- a. During this reporting period, three flight tests were performed on Model 103. The first flight test of two hours duration was performed on 18 February 1958. This flight test was carried out at medium altitude without a controlled signal environment. With the exception of a continuous lock-up indication by the Band 2 receiver, system operation was normal.
- b. On 20 and 22 February 1958, two flight tests at maximum altitude and using controlled signal sources were performed. These tests lasted seven and six hours respectively and the course flown was essentially the same as that established for flight tests on previous models of System 4. The Band 2 receiver was again locked-up on both of these tests.
- c. During the first test, the Band 3 receiver showed a loss of slewing capability during the first half of the flight. During the remainder of the first flight and throughout the second flight slewing capability was restored, although somewhat erratic.
- d. In both flights, the performance of Band 7 receiver was poor at the high end of its frequency band, and the camera action appeared normal although film breakage occurred near the end of the film supply.
- e. The field tests had originally been scheduled so that system delivery could be made on 24 February 1958 if the tests indicated a high system reliability. However, because of the problems encountered, customer acceptance was postponed.

4. Defects Observed in Field Test

- a. The locked-up condition of Band 2 receiving equipment was found to be due to a UHF parasitic in the tape transport. Steps to eliminate this parasitic will be taken during the next reporting interval.

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- b. The Band 3 receiver failure in the second and third flight test was caused by the loss of a roll pin in one of the gears. This was repaired in the field.
- c. The difficulties in the Band 7 receiver were due to mechanical damage in the ball-bearing race associated with the tuning arm of the preselector. Repairs were made at the contractor's plant.
- d. Film breakage in the camera appears to have been caused by loss of film loop. This can probably be corrected by spacing the guide rollers closer to the sprocket which moves the film. This problem will be investigated during the next reporting interval.
- e. Questions were raised by the customer's representative as to the sensitivity of some of the receiving equipments in use in the field. In view of the postponement of delivery of Model 103, it was recommended that the receivers in question be returned for a close check of sensitivity and to effect the improvements which may be necessary to raise its sensitivity to the level of Models 101 and 102.
- f. It was observed in the field that marginal performance of the magnetic core shift registers developed when certain digit configurations were applied. This difficulty appears to be caused by some of the components used in coupling networks and an effort is being made to improve performance.

5. Production

Construction of Model 104 was completed during the interval covered by this letter and preliminary unit and subassembly tests are now underway.

6. Planning

During the next reporting interval the major effort will be directed toward improving the performance of Model 103 and advancing the environmental tests of Model 104.

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